REMARKS/ARGUMENTS

Claims 1-3, 5, and 8 are pending in this application. By this Amendment, Applicant amends Claim 1 and cancels Claims 4, 6 and 7.

Claims 6 and 7 have been canceled because they are directed to a non-elected invention. Applicant reserves the right to file a Divisional Application to pursue prosecution of Claims 6 and 7.

Claims 1-5 and 8 were rejected under 35 U.S.C. § 102(b) as being anticipated by Shimizu (U.S. 5,834,345). Claims 1-3 and 5 were rejected under 35 U.S.C. § 102(b) as being anticipated by Yamazaki et al. (U.S. 5,837,614). Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamazaki et al. in view of Ohta et al. (Ultrathin fluorinated silicon nitride gate dielectric films formed by remote plasma enhanced chemical vapor deposition employing NH_3 and SiF_4). Claim 4 has been canceled. Applicant respectfully traverses the rejections of Claims 1-3, 5, and 8.

Claim 1 has been amended to recite:

> A transistor comprising:
> a source electrode and a drain electrode arranged in mutually opposing relation;
> a semiconductor film comprising at least one layer disposed between the source electrode and the drain electrode;
> a gate electrode disposed in adjacent relation to the semiconductor film; and
> a gate insulating film disposed between the gate electrode and each of the source electrode, the drain electrode, and the semiconductor film, wherein
> **a concentration of fluorine contained in the gate insulating film is 1×10^{20} atoms/cm^3 or less**;
> **the transistor is of an inverted stagger type in which the gate insulating film and the semiconductor film are formed in that order and the semiconductor film is disposed on the gate insulating film**; and
> **the gate insulating film is an amorphous silicon nitride film**.
> (emphasis added)

With the unique combination and arrangement of features recited in Applicant's

Claim 1, including the features of "a concentration of fluorine contained in the gate insulating film is 1 x 10^{20} atoms/cm^3 or less," "the transistor is of an inverted stagger type in which the gate insulating film and the semiconductor film are formed in that order and the semiconductor film is disposed on the gate insulating film," and "the gate insulating film is an amorphous silicon nitride film," Applicant has been able to provide a transistor which suppresses characteristic degradation resulting from fluorine contained in the thin film composing the transistor, and which provides excellent reliability even when it is continuously driven for a long period of time at a relatively high temperature (see, for example, paragraph [0008] on page 3 of the Substitute Specification).

The Examiner alleged that each of Shimizu and Yamazaki et al. teaches all of the features recited in Applicant's Claim 1.

Applicant's Claim 1 has been amended to recite the features of "the transistor is of an inverted stagger type in which the gate insulating film and the semiconductor film are formed in that order and the semiconductor film is disposed on the gate insulating film" and "the gate insulating film is an amorphous silicon nitride film." Support for these features is found, for example, in paragraph [0019] bridging pages 6 and 7 of the Substitute Specification and in Fig. 1 of the originally filed drawings.

Shimizu teaches a thin film transistor of an inverted stagger type. Similar to the present invention, the gate insulating film 3 and the semiconductor film 4 are formed in that order after the reaction chamber is cleaned, such that the semiconductor film 4 of Shimizu is disposed on the gate insulating film 3. Since the gate insulating film 3 of Shimizu is formed first, the fluorine remaining in the reaction chamber after cleaning is caught in the gate insulating film 3, not in the semiconductor film 4. Thus, contrary to the Examiner's allegation that "the gate insulating film (3) [of Shimizu] does not contain a concentration of fluorine," the gate insulating layer 3 of Shimizu would inevitably contain a concentration of fluorine unless special measures are taken to remove the residual fluorine from the reaction chamber prior to forming the gate insulating film 3. Since no such special measures are taught or suggested in Shimizu, the gate insulating

film 3 of Shimizu does, in fact, contain a concentration of fluorine.

Applicant notes that the hydrogen plasma used to transform the first amorphous semiconductor layer 4 of Shimizu into a micro-crystal semiconductor layer would not remove the residual fluorine prior to being caught in the gate insulating film because the hydrogen plasma is generated after the formation of the semiconductor film 4, and not before the formation of the gate insulating film 3.

Shimizu fails to teach or suggest anything at all about the specific concentration of fluorine contained in the gate insulating film 3. Thus, Shimizu certainly fails to teach or suggest the feature of "a concentration of fluorine contained in the gate insulating film is 1×10^{20} atoms/cm^3 or less" as recited in Applicant's Claim 1

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claim 1 under 35 U.S.C. § 102(b) as being anticipated by Shimizu.

The gate insulating film 204 of Yamazaki et al. includes, as a main component, a silicon oxide, not an amorphous silicon nitride. Yamazaki et al. fails to teach or suggest that the gate insulating film 204 could or should be made of any other materials, and certainly fails to teach or suggest that the gate insulating film 204 could be made of silicon nitride. In fact, Yamazaki et al. is directed solely to a silicon oxide gate insulating film. Thus, Yamazaki et al. clearly fails to teach or suggest the feature of "the gate insulating film is an amorphous silicon nitride film" as recited in Applicant's Claim 1.

In addition, the transistor of Yamazaki et al. is of a stagger type in which the semiconductor film 4 and the gate insulating film 3 are formed in that order. Yamazaki et al. fails to teach or suggest the transistor could or should be of an inverse stagger type in which the gate insulating film and the semiconductor film are formed in that order. Thus, Yamazaki et al. certainly fails to teach or suggest the feature of "the transistor is of an inverted stagger type in which the gate insulating film and the semiconductor film are formed in that order and the semiconductor film is disposed on the gate insulating film" as recited in Applicant's Claim 1.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of

the rejection of Claim 1 under 35 U.S.C. § 102(b) as being anticipated by Yamazaki et al.

The Examiner relied upon Ohta et al. to allegedly cure deficiencies of Yamazaki et al. However, Ohta et al. clearly fails to teach or suggest the feature of "the transistor is of an inverted stagger type in which the gate insulating film and the semiconductor film are formed in that order and the semiconductor film is disposed on the gate insulating film" as recited in Applicant's Claim 1.

With respect to the feature of "the gate insulating film is an amorphous silicon nitride film" which was originally recited in Claim 4, and is now recited in amended Claim 1, the Examiner alleged that it would have been obvious "to provide the silicon nitride film of Ohta et al. as the gate insulating film instead of the silicon oxide film of Yamazaki." Applicant respectfully disagrees.

Yamazaki et al. is directed to a very specific silicon oxide insulating film which is made by a very specific method including very specific materials to achieve desired properties and characteristics. Yamazaki et al. fails to teach or suggest that the very specific method and materials disclosed therein are suitable for use with any other type of insulating film, and certainly fails to teach or suggest that the very specific method and materials are suitable for use with an amorphous silicon nitride insulating film. In addition, Yamazaki et al. fails to disclose that the method and materials disclosed therein would achieve the desired properties and characteristics if applied to a silicon nitride insulating film, and the Examiner has failed to explain if or how the desired properties and characteristics would be achieved with a silicon nitride insulating film.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to replace the silicon oxide insulating film of Yamazaki et al. with the silicon nitride insulating film taught by Ohta et al.

Thus, Applicant respectfully submits that Ohta et al. fails to cure the deficiencies of Yamazaki et al. described above.

Accordingly, Applicant respectfully submits that Shimizu, Yamazaki et al., and

Ohta et al., applied alone or in combination, fail to teach or suggest the unique combination and arrangement of features recited in Applicant's Claim 1.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claim 1 is allowable. Claims 2, 3, 5, and 8 depend upon Claim 1, and are therefore allowable for at least the reasons that Claim 1 is allowable.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

To the extent necessary, Applicant petitions the Commissioner for a One-Month Extension of Time, extending to November 26, 2007, the period for response to the Office Action dated July 26, 2007.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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